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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,708	11/13/2001	Robert A. Jacobsen	APT1:062	9924

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ROSSI & ASSOCIATES
P.O. Box 826
Ashburn, VA 20146-0826

EXAMINER

ROGERS, DAVID A

ART UNIT PAPER NUMBER

2856

DATE MAILED: 03/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/007,708

Applicant(s)

JACOBSEN ET AL.

Examiner

David A. Rogers

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment Filed 13 March 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,19 and 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,19 and 20 is/are rejected.
- 7) ☒ Claim(s) 3 and 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 March 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Specification

2. The disclosure is objected to because of the following informalities. In amended paragraph 12, line 9 change --control station 12-- to --control station 8--. On page 7, line 2 of the original disclosure change --castor wheel 23-- to --castor wheel (not shown)--. On page 10, line 6 of the original disclosure change --shown in Figs. 7 and 8-- to --shown in Fig. 8-- and then add a space before the word --provided--. Appropriate correction is required.

Claim Objections

3. Claims 3 and 5 are objected to because of the following informality. Claims 3 and 5 depend on claim 2, which has been cancelled by the applicant. The limitations of claim 2 are incorporated into claim 1. It is assumed that the applicant's intent would be to require claims 3 and 5 to depend on the amended claim 1. The application has been examined in this manner. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 3, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,318,254 to Shaw *et al.* in view of U.S. Patent Application Publication 20030043964 to Sorenson.

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Shaw teaches a remotely controlled aircraft maintenance robot (reference item 20), as best seen in Figures 1 and 2. Furthermore, Shaw teaches a control station (reference item 156) to control the aircraft maintenance robot, as best seen in Figures 9 and 10. Shaw teaches that the maintenance robot comprises an antenna (reference item 72) for communicating with the control station in a wireless manner. The control station comprises an antenna (reference item 158) for communicating in a wireless manner with the maintenance robot (column 6, lines 4-12 and column 6, lines 58-61). The maintenance robot comprises a mast (reference item 26) and an articulating arm (reference items 36 and 38), where the inner arm (reference item 38) is connected to the mast via a trunion (reference item 40). In use the inner arm is raised and lowered as required and as seen in Figure 1. By the raising and lowering of the inner arm the device of Shaw is capable of positioning the outer arm, and its distal end in particular, in an accurate manner. Shaw further teaches that a camera (reference item 76) mounted near the end of the outer arm (reference item 36) may be an infrared camera, a thermographic sensor, an ultrasonic sensor, video camera, or any appropriate sensor or viewing device (column 4, lines 10-13). Ultrasonic sensors are well known in the art as being capable of nondestructive inspection of structures as in the instant application. Furthermore, Shaw teaches that a probe (reference item 230) may be installed in the manifold (reference item 44) located at the end of the outer arm (reference item 36). Shaw teaches that the probe may be a probe that allows the inspection of the aircraft surfaces with the use of X-rays (column 7, lines 63-68). X-rays are also well known in the art as being capable of nondestructive inspection of structures, as in the instant application. Shaw further teaches a propulsion system for the main chassis (column 3, lines 61-66). Shaw, however, does not teach a vehicle with low profile main chassis for maneuvering under portions of a structure and a mast fixed and extendable perpendicular to the main chassis. Sorenson teaches a large structure inspection device comprising a mobile main chassis, a mast that is fixed and extendable perpendicular to the chassis, and an

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articulating arm connected to the upper end of the extendable mast. Furthermore, the device of Sorenson comprises non-destructive inspection means located at the distal end of the articulating arm. The extendable mast of Sorenson and the movable arm member of Shaw perform the same function of accurately positioning the articulating arm, and the inspection head in particular. Finally, as can be seen in Figure 1, the main chassis is relatively small and would be capable of maneuvering under a structure. This would be highly desired in the case of Shaw as it would allow even greater flexibility in locating the inspection head in hard-to-access regions of the structure. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Shaw with the teachings of Sorenson to obtain an robotic inspection vehicle comprising a extendable mast fixed to a main chassis and an articulating arm attached to the fixed mast, where the chassis is small to allow maneuvering under a structure, in order to allow the inspection device greater positioning flexibility for inspecting regions that might otherwise prove difficult to access.

2. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw in view of Sorenson as applied to claims 1 and 3 above, and further in view of U.S. Patent 5,633,707 to Seemann. With regard to claim 4 it is widely known that propulsion systems, including gas turbine engines, comprise at least one battery. Therefore, the apparatus of Shaw would anticipate claim 4 when interpreting the claim in its broadest, most reasonable manner. Shaw teaches that gas turbine propulsion system is preferred, however other similarly compatible forms of locomotion are considered (column 3, lines 63-66). Replacing a gas turbine engines, as used in the device of Shaw, with an all-electric propulsion system would be within the scope of one of ordinary skill. An example of converting from gas turbine to electric motor propulsion can be found in the automotive industry. Even if it was not within the scope of one of ordinary skill, Seemann teaches a robotic aircraft inspection apparatus comprising an inspection vehicle, as best seen in Figures 1 and 2. Seemann

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teaches that the nondestructive inspection apparatus comprises an electric motor (reference item 24) to drive the vehicle (column 4, lines 22-31). It is widely known that vehicles powered by electric motors typically have at least one battery. Furthermore, one would be motivated to utilize an electric propulsion system in lieu of a gas turbine, as in the device of Shaw, in order to reduce and/or eliminate the amount of hazardous exhaust fumes that exist, especially if the inspection of the large structure was to occur within the confines of a closed environment such as an aircraft hanger. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Shaw and Sorenson with the teachings of Seemann to obtain a nondestructive inspection apparatus comprising a vehicle with an electric propulsion system comprising at least one battery.

3. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw in view of Sorenson as applied to claim 1 above. Claim 19 requires the main chassis to have a height of less than 1 meter. The applicant teaches that this is preferred so as to allow the chassis to maneuver under the structure to be inspected. Shaw and Sorenson disclose mobile devices for inspecting large structures. Sorenson, as best seen in Figure 1, teaches that the height of the main chassis of the inspection device is quite small relative to the large structure being inspected. Based on Figure 1, the main chassis (reference item 20) appears to have a total height of about 1.78 meters assuming the operator (reference item 80) is about 5.8 feet tall. This height would allow for the main chassis to maneuver under some structures, particularly in the case of large aircraft. Furthermore, Sorenson teaches a second inspection apparatus with a second chassis (reference item 30) that is significantly smaller than the first chassis. The smaller size of the second chassis would clearly allow it to maneuver under, or even within, large structures. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Shaw with the teachings of Sorenson to obtain an

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inspection apparatus whose main chassis has a height of less than one meter so as to allow the apparatus greater flexibility to maneuver around, under, or even in a structure to be inspected.

4. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw in view of Sorenson as applied to claim 1 above, and further in view of U.S. Patent Application Publication 20030048081 to Seeman. Shaw in view of Sorenson teach mobile inspection device for inspecting large structures. Shaw utilizes motor-driven two tracks (reference item 30 and 32) for moving the device. Sorenson utilizes four wheels for maneuvering the device. Neither Shaw nor Sorenson teaches the use of motor driven wheels and a castor wheel arranged in a triangular manner. Seemann teaches a mobile inspection device for inspecting structures. As best seen in Figure 1, the inspection device comprises a triangular arrangement of wheels. There are two motor-driven wheels (reference item 76 and 80) and a castor wheel (reference item 72) and are mounted to provide three points of support for the base (page 5, paragraph 42). Additional wheels (reference items 84 and 88) are optional (page 5, paragraph 43). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Shaw in view of Sorenson with the teachings of Seemann to obtain an inspection apparatus comprising three wheels forming a triangular base that supports the main chassis and where two of the wheels are motor-driven and one wheel is a castor wheel in order to allow maneuvering of the main chassis by a remote operator and to allow a greater degree of flexibility in the maneuvering that the castor wheel provides so that the device can be positioned to inspect areas that might otherwise be inaccessible.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period

for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. U.S. Patent 3,889,904 to Jones *et al.* discloses a low-profile chassis capable of maneuvering underneath large structures such as an aircraft and comprising three wheels formed in a triangular manner and where one wheel is a castor wheel.
- b. U.S. Patent 3,911,733 to Bhuta *et al.* discloses in Figure 2 a low-profile chassis capable of maneuvering underneath large structures and comprising an articulating arm with a non-destructive inspection tool mounted on its distal end.
- c. U.S. Patent 4,084,427 to Jacoby *et al.* discloses a low profile chassis capable of maneuvering underneath large structures and comprising an articulating arm with a non-destructive inspection tool mounted on its distal end.
- d. U.S. Patent 5,643,476 to Garmire *et al.* discloses a mobile vehicle comprising an extendable mast structure that is fixed to the main chassis and extends perpendicular to the chassis and further comprising an arm attached to the top of the mast structure for performing maintenance on a structure.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Rogers whose telephone number is (703) 305-4451. The examiner can normally be reached on Monday - Friday (0730 - 1600).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron E. Williams can be reached on (703) 305-4705. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-3431.

dar
March 19, 2003

HELEN KWOK
~~PRIMARY EXAMINER~~
PRIMARY EXA...

